

ABSTRACT

The present invention encompasses a high efficiency pulse width modulator comprising: a variable duty cycle oscillator for receiving an input signal and providing a low level switching signal; a source voltage differentiation dependant positive switching signal circuit for receiving the low level switching signal, a stable reference signal, a sample of a positive supply voltage signal, and an error signal and the providing a positive supply switching signal and a reference signal; a positive supply switching circuit for receiving the positive supply switching signal and providing an output signal to an inductive load; an output voltage dependant negative supply switching signal circuit for receiving the output signal and a negative supply voltage signal and providing a negative supply switching signal; a negative supply switching circuit for receiving the negative supply switching signal and providing clamping of the inductive load to the negative supply, an output sourced charge pump for receiving the output signal and the positive supply voltage signal and providing a high voltage power supply; an output comparison circuit for receiving a sample of the output signal and a reference signal from the positive supply switching circuit, comparing the output signal to the reference signal and turning off the positive supply switching circuit when the output signal is lower than the reference signal; and a timing circuit for receiving an error signal from the comparison circuit and providing a feedback signal to the error circuit.